wherein said first and second alignment layers are combined with said liquid crystal material so an angle between an extending direction and an optical axis of a *batonnet* is within about ±1 degree; and

wherein said first and second rubbed alignment layers have a surface tension of 49 dyn/cm to 53 dyn/cm.

REMARKS

Applicants wish to thank Examiner Rude and his supervisor, Examiner Tai Duong for the interviews on February 4, 2003 and March 25, 2003.

Claims 1, 2, 5-11 and 14, 15, and 18 are pending in the Application. Applicants cancel claims 3, 4, 16, and 17 without prejudice or disclaimer of their subject matter and amend claims 1 and 14 to more appropriately define the present invention. In the Final Office Action the Examiner withdrew the rejection of claims 14, 15, and 18 under 35 U.S.C. § 112, first paragraph. Claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent 5,936,689 to Saishu et al. (Saishu) in view of U.S. Patent 5,686,019 to Nakamura. Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being anticipated by Tanaka JP 04-371925. Claims 5-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka as applied to claims 1 and 2 in view of Nakamura. Claims 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Saishu and Nakamura as applied to claim 8 in view of Tanaka. Further, the Examiner stated that claim 11 is either not considered patentably distinct or subject to a restriction requirement.

In the Final Office Action, the Examiner rejected claims 1-2 and 8-9 under 35 U.S.C. § 103(a) but stated that claims 1 and 2 were *anticipated* by Tanaka and that

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claims 8 and 9 were *anticipated* by Saishu in view of Nakamura. However, anticipation is the standard applied to 35 U.S.C. § 102. Respectfully, Tanaka does not anticipate (under § 102) or render obvious (under § 103(a)) claims 1-2 because Tanaka does not teach or suggest each and every recitation of claims 1-2, as discussed below. Further, combining two references cannot from the proper basis for an anticipation rejection. In particular, the combination of Saishu and Nakamura cannot "anticipate" claims 8-9.

The rejections of claims 1-11 are respectfully traversed, since a *prima facie* case of obviousness has not been made by the Examiner.

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. (See M.P.E.P. § 2143.01 (8th ed. 2001)). Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of these requirements must "be found in the prior art, and not based on Applicant's disclosure." (M.P.E.P. § 2143 (8th ed. 2001)).

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) over Tanaka. The Examiner alleges that Tanaka discloses all of the features of claim 1 except that the first and second alignment layers are combined with the liquid crystal material so that a shifted angle between the extending direction and quenching direction of a *batonnet* is within $\pm$ 1 degree. However, the Examiner alleges that Figure 3 of the present Application shows the shifted angle between the extending direction and an optical axis

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of a *batonnet*, ($\theta_{OA}-\theta_B$), is within $\pm$ 1 degree for all examples where the angle of the optical axis is less than 7 degrees (half the 14 degree angle between the rubbing directions). The Examiner states that Tanaka's angle between the rubbing directions is 6.8 degrees, less than 14 degrees, so the resulting shifted angle between the extending direction and the optical axis of a *batonnet* will be within $\pm$ 1 degree.

Applicants respectfully disagree with the Examiner's analysis. The Examiner's combination of Tanaka with Applicant's Figure 3 is improper hindsight. In this case the Examiner states that Figure 3 of the present Application shows the shifted angle between the extending direction and an optical axis of a *batonnet*, ($\theta_{OA}-\theta_B$), is within $\pm$ 1 degree for all examples where the angle of the optical axis is less than 7 degrees (half the 14 degree angle between the rubbing directions). The Examiner states that Tanaka's angle between the rubbing directions is 6.8 degrees, less than 14 degrees, so the resulting shifted angle between the extending direction and the optical axis of a *batonnet* would be within $\pm$ 1 degree. The Examiner further alleges that "[t]his is not improper hindsight, because the result is known (as taught by Applicants) to be a function of the structure taught by Tanaka." See Office Action of November 7, 2002, page 11.

Respectfully, the information contained in Applicant's Figure 3 was not part of the prior art at the time of the invention. Rather, Applicants conducted a series of experiments of judiciously selecting various alignment layers and combining them with various liquid crystal materials to determine optimal combinations for use in liquid crystal displays. The results of the combinations were not known until the investigation undertaken by the Applicants. Using the information discovered by the Applicants to

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supply the claim recitations missing from Tanaka is improper hindsight because it includes knowledge gleaned only from the disclosure of the Applicants. See *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Further, Tanaka specifically teaches away from a liquid crystal electro-optical element in which the longitudinal direction (extending direction) and optical axis of the liquid crystal are shifted. Indeed, Tanaka discloses that the extending direction and the optical axis are identical. See Tanaka page 3, paragraph [0013], line 3 and Figures 1(a)-(c). Tanaka also intends to achieve uniaxial orientation of the liquid crystals. An extending direction identical to the optical axis is not the same as the angle between the extending direction and an optical axis of a *batonnet* shifted to be within ± 1 degree, as recited in claim 1, because when directions are identical they are not shifted from each other.

The Examiner also attempts to use Tanaka's disclosure of the difference between the rubbing direction and the optical axis in an effort to show the extending direction and an optical axis of a *batonnet* shifted to be within ± 1 degree, as recited in claim 1. Regardless, however, of the difference between the rubbing direction and the optical axis in Tanaka, nowhere does Tanaka teach or suggest a shift between the *extending direction and the optical axis*, as recited in claim 1. A rubbing direction is not the same thing as an extending direction because a rubbing direction is the direction in which a layer is rubbed whereas the extending direction is the longitudinal direction of the *batonnet*.

Independent claim 8, and now independent claims 1 and 14, among other things, recite that the first and second alignment layers are rubbed alignment layers and that

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surface tension of each of said first and second alignment layers is between about 49 dyn/cm and about 53 dyn/cm. Respectfully, the combination of Tanaka, Saishu, and Nakamura does not render the claims obvious because Nakamura teaches away from the disclosure of Tanaka and Saishu and because Nakamura does not correct the deficiencies of Tanaka and Saishu. Because Nakamura teaches away from both Tanaka and Saishu, the combination of Nakamura with Tanaka or Saishu is improper. Further, Nakamura's teaching away from Tanaka and Saishu shows that one of ordinary skill in the art would not have been motivated to combine Nakamura with either of Tanaka and Saishu and that any such combination would be unsuccessful.

Specifically, Tanaka and Saishu require aligning, i.e., rubbing, the first and second alignment films whereas Nakamura explicitly teaches aligning only the first alignment layer. See Tanka page 3, paragraph [0011], lines 7-8; Saishu column 7, lines 27-38; and Nakamura column 11, lines 23-25. In particular, Nakamura states: "the second substrate constituting the liquid crystal device of the present invention is not subjected to a uniaxial alignment treatment." See Nakamura column 11, lines 23-25; and see Nakamura column 5, lines 37-43, column 9, lines 32-38, column 17, line 65 through column 18, line 3, and column 18, lines 10-15. While Nakamura Example 6 shows rubbed first and second alignment layers, Nakamura explicitly teaches away from the Example 6, stating that the produced cell showed "alignment defects and a low contrast." See Nakamura col. 19, lines 3-4. Indeed, Nakamura is concerned with finding alignment materials that do not require alignment, such as by rubbing. To this end Nakamura discloses specific examples of non-rubbed alignment materials. See Nakamura column 11, line 32 through column 13, line 11. Thus, the combination of

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Tanaka and Saishu with Nakamura is inappropriate because Nakamura teaches away from aligning both alignment films as is necessary in Tanaka and Saihshu.

In the Final Office Action the Examiner also pointed to Examples 1 and 9 of Nakamura in an attempt to show that Nakamura teaches that the surface tension of each of said first and second alignment layers is between about 49 dyn/cm and about 53 dyn/cm. However, neither of Examples 1 or 9 disclose that the surface tension of each of said first and second alignment layers is between about 49 dyn/cm and about 53 dyn/cm, as recited in independent claims 1, 8, and 14. In Nakamura, the surface tension of the first alignment layer in Example 1 is 50 dyn/cm and in Example 9 it is 49 dyn/cm. However, in both Examples 1 and 9, the surface tension of the second alignment layer is only 30 dyn/cm. See Nakamura Table 2. A second alignment layer having a surface tension of only 30 dyn/cm is not a second alignment layer having a surface tension between about 49 dyn/cm and about 53 dyn/cm, as recited in claims 1, 8, and 14.

Accordingly, Applicants submit that claims 1, 8, and 14 are patentable over Tanaka, Saishu, and Nakamura either individually or in any combination. Further, because claims 2 and 5-7 depend from independent claim 1, Applicants submit that claims 2 and 5-7 are allowable for at least the same reasons as claim 1. In addition, because claims 9-13 depends from independent claim 8, Applicants submit that claims 9-13 are allowable for at least the same reasons as claim 8. Moreover, because claims 15 and 18 depend form claim 14, Applicants submit that claims 15 and 18 are allowable for at least the same reasons as claim 14.

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In view of the foregoing remarks, Applicants submit that this claimed invention is neither anticipated nor rendered obvious in view of the prior art references cited against this Application. Applicants therefore request the Examiner's reconsideration of the Application, and the allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P.

Dated: April 4, 2003

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APPENDIX TO AMENDMENT OF APRIL 4, 2003

Version with Markings to Show Changes Made

Amendments to the Claims

Please amend claims 1 and 14 as follows:

1. (Amended) A liquid crystal display element comprising:

a first electrode structure having a first transparent substrate, a first electrode formed on said first substrate, and a first rubbed alignment layer formed on said first substrate so as to cover said first electrode;

a second electrode structure having a second transparent substrate, a second electrode formed on said second substrate, and a second rubbed alignment layer formed on said second substrate so as to cover said second electrode; and

a light modulating layer of an anti-ferroelectric liquid crystal material which is sandwiched between said first and second electrode substrates covered with first and second rubbed alignment layers and which has a thresholdless voltage-transmittance characteristic,

wherein said first and second alignment layers are combined with said liquid crystal material so that a shifted angle between the extending direction and an optical axis of a *batonnet* is within ± 1 degree; and

wherein said first and second rubbed alignment layers have a surface tension of 49 dyn/cm to 53 dyn/cm.

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14. (Twice amended) A liquid crystal display element comprising:

a first substrate including, a first electrode formed on said first substrate, and a first alignment layer wherein said first alignment layer covers said first electrode;

a second substrate including, a second electrode formed on said second substrate, and a second alignment layer wherein said second alignment layer covers said second electrode; and

a light modulating layer of an anti-ferroelectric liquid crystal material between said first and second substrates and wherein said anti-ferroelectric liquid crystal material has a thresholdless voltage-transmittance characteristic,

wherein said first and second alignment layers are combined with said liquid crystal material so an angle between an extending direction and an optical axis of a *batonnet* is within about ±1 degree; and

wherein said first and second rubbed alignment layers have a surface tension of 49 dyn/cm to 53 dyn/cm.

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